

## **TRIANGULAR CARTON, BLANK, AND METHOD**

### **BACKGROUND OF THE INVENTION**

The present invention relates generally to cartons or containers and, more particularly, to improved containers having a three-piece, generally  
5 triangular prismatic construction. It is particularly advantageous for use in connection with objects having at least a portion which is generally in circular cross-sectional shape, such as cans, bottles, balls, rolls, tubes, and the like.

Traditionally, cartons or containers for multi-packs of beverage containers, such as six-pack or twelve-pack cartons for beer, soft drinks, and the  
10 like have been formed by folding and securing from one-piece blanks of paper board sheet material. Often, it is desired to employ a paper board sheet material that is laminated with a decorative plastic, foil, and/or printed layer to increase attractiveness to the consumer. Such laminates must be formed prior to forming the blank and add significantly to the cost of the sheet material, particularly  
15 where laminate includes a metallized or holographic layer. Thus, a drawback of using a one-piece carton is that the tops and bottoms of the carton are also, necessarily, formed of the expensive laminate sheet material. This adds to the cost of the carton, while adding little or no additional value to the carton since, generally, only the side of the carton is viewed by the purchaser, i.e., when it is  
20 stacked on a shelf or display, e.g., at a place of purchase.

Another drawback of the conventional one-piece carton designs is the large amount of waste typically generated when the blanks are stamped or die cut. This likewise adds to the cost of the carton, particularly when an

expensive laminated paperboard sheet material is used, again, since any decorative laminates must be applied prior to cutting the blank.

The present invention provides a new and improved carton, blank, and method that overcome the above-referenced problems and others.

## SUMMARY OF THE INVENTION

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In one aspect, a carton for carrying a plurality of like objects having a generally circular cross-sectional shape includes a generally triangular first panel forming a base of the carton having first, second, and third sides and a generally triangular second panel coextensive with the base panel and opposing  
10 the base panel in aligned facing relation. A one-piece peripheral sidewall is secured to and extends between the first and second panels and has a cross-sectional shape coextensive with the first and second panels. The peripheral sidewall has three planar sides, each of which is connected to an adjacent planar side through a non-folded corner having a radius of curvature which is  
15 approximately equal to a radius of curvature of the objects to be carried.

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In another aspect, a carton sidewall blank is formed of a sheet material being cut and scored and adapted to be assembled to define a tubular carton sidewall having generally triangular cross-sectional shape. The blank is further adapted to be combined with at least one separately formed, generally  
20 triangular end closure panel to define a generally triangular prismatic carton, the triangular prismatic carton being adapted to carry a plurality of like objects having a generally circular cross-sectional shape. The blank includes a generally rectangular main portion for forming the tubular sidewall and a first fold line parallel to a first edge of the main portion defining a first folding strip along the  
25 first edge. A second fold line runs parallel to a second edge of the main portion opposite the first edge and defines a second folding strip along the second edge. A plurality of score lines within the folding strips run perpendicular to the first and second fold lines and are arranged to facilitate bending the sidewall blank to form the tubular carton sidewall wherein the tubular carton sidewall has three planar  
30 sidewall surfaces wherein each planar sidewall surface is adjoined to an adjacent

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planar sidewall surface via a curved sidewall surface having a radius of curvature approximately equal to a radius of curvature of the objects to be carried.

In yet another aspect of the present invention, a method of forming a generally triangular prismatic carton adapted to carry a plurality of like objects having a generally circular cross-sectional shape is provided. The method comprises forming sidewall blank from a sheet of material comprising a generally rectangular main portion for forming the tubular sidewall and scoring a first fold line on the main portion parallel to a first edge of the main portion, the fold line defining a first folding strip along the first edge. A plurality of score lines are scored within the first folding strip running perpendicular to the first and second fold lines. The sidewall blank is bent to form a tubular carton sidewall having three planar sidewall surfaces wherein each planar sidewall surfaces is adjoined to an adjacent planar sidewall surface via a curved sidewall surface having a radius of curvature approximately equal to a radius of curvature of the objects to be carried, wherein the plurality of score lines arranged to facilitate the bending. An end of the tubular carton sidewall is closed by attaching a separately formed, generally triangular panel.

One advantage of the present invention resides in the provision of a triangular carton which uses less sheet material than the conventional rectangular cartons, thereby reducing its cost.

Another advantage of the present invention resides in the provision of a three-piece carton construction which does not require the base and top portion to be formed from the same sheet material as the sidewall portion. As such, the cost of the components is reduced even more since expensive printed and/or laminated materials such as a sheet material having lithographic, foil, or holographic laminate layers can be reserved for the sidewall, and wherein an inexpensive undecorated sheet material may be used for the base and/or cover portions.

Yet another advantage of the present invention resides in the fact that its manufacture may be adapted to existing assembly equipment.

Yet another advantage resides in a the provision of a prismatic carton system allowing cylindrical, spherical, or other objects having a generally circular cross-sectional shape to be packaged in less space, thereby reducing space requirements and/or storage costs for the packaged goods.

5 Still further benefits and advantages of the invention will become apparent to those of ordinary skill in the art upon reading and understanding the following detailed description of the preferred embodiments.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the invention as claimed. The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate embodiments of the invention and together with the general description, serve to explain the principles of the invention.

#### BRIEF DESCRIPTION OF THE DRAWINGS

15 The following detailed description may be best understood when read in reference to the accompanying drawings wherein:

FIGURE 1 is a perspective view of an exemplary carton in accordance with the present invention;

FIGURE 2 is an exploded view of an exemplary carton of the invention, further including a cover, illustrating the three-piece construction;

FIGURE 3 is a plan view of a blank for forming the side wall of the carton shown in FIGURE 1;

FIGURE 4 is a perspective view of a carton in accordance with a further embodiment of the invention;

FIGURE 5 is a plan view of a blank for forming the side wall of the carton shown in FIGURE 4;

FIGURE 6 is an exploded view of a carton for beverage containers in accordance with yet another embodiment of the invention;

FIGURE 7 is a plan view of an exemplary bottom blank for forming a carton base;

FIGURES 8A and 8B are fragmentary cross-sectional views taken along the lines 8--8 of FIGURE 1, illustrating exemplary manners of securing the bottom blank to the side wall;

5      FIGURE 9 is an exploded view of a carton according to yet another embodiment of the present invention;

FIGURES 10 and 11 depict alternative lid members for use with the embodiment of FIGURE 9.

FIGURE 12 is a perspective view of a carton according to still another embodiment of the present invention;

10      FIGURE 13 is an exploded view of a carton for spherical objects, such as golf balls, in accordance with still another embodiment; and

FIGURES 14 and 15 illustrate multi-pack arrangements of the cartons as shown in FIGURE 13.

15      FIGURE 16 is an exploded view of a carton according to a further embodiment of the present invention.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIGURE 1, a generally triangular carton **10** includes a vertically raised peripheral sidewall **12** secured to a base **14** (see FIGURE 2). The carton **10** is adapted to hold objects which are generally cylindrical or  
20      otherwise have a generally circular cross-sectional shape, such as beverage bottles **16** or cans. It will be recognized that the dimensions of the carton **10** may be adapted to hold other types of objects having a generally circular cross-sectional shape such as spherical objects such as balls, or elongate objects such as such cigars, cigarettes, rolls of sheet material such as aluminum foil, plastic  
25      wrap, paper products, and the like. The carton is particularly suited to hold the bottles **16** or other objects in a triangular configuration wherein each bottle is placed or interposed between two bottles of an adjacent row. Thus, the carton **10** of the present invention may hold, for example, three, six, ten, fifteen, twenty-one, twenty-eight, thirty-six objects, and so on.

The carton **10** preferably includes a structurally reinforced upper rim **18**. This may be formed, for example, by folding or rolling the upper edge of the sidewall panel **12**. In a preferred embodiment, the upper rim **18** is formed by folding the upper edge of the sidewall panel **12** toward the interior facing surface thereof. In another preferred embodiment, the upper rim **18** is formed by rolling the upper edge of the sidewall panel **12** toward the exterior facing surface thereof.

The carton **10** is depicted in FIGURE 1 with an optional handle **20**. Preferably, the handle **20** is integrally formed with the sidewall panel **12**, although handles that are separately formed and attached to the container are also contemplated.

Referring now to FIGURE 2, there is shown an exploded view of the container **10** shown in FIGURE 1, further including a lid or cover **22**. The lid **22** includes an upper portion or panel **24** and a peripheral base portion **26**. In one embodiment, the lid **22** is a one-piece folded unit which is sized to engage the upper rim **18** in removable fashion, e.g., via a frictional fit, snap fit, etc., to cover an opening **23** in the carton **10**.

Alternatively, the upper portion **24** of the lid **22** may be moveable with respect to or separable from the base portion **26**. For example, the base portion **26** may attach to the rim **18** of the sidewall **12** with the upper portion **24** being removably and/or moveably mounted on the base portion **26** of the cover **22**. For example, the base portion **26** may be secured to the rim **18**, e.g., via an adhesive, mechanical fastener, or the like. The upper portion **24**, in turn, is movably or removably secured to the base portion **26**, e.g., via a frictional fit, snap fit, or other retention means. In an especially preferred embodiment, the upper portion **24** is secured to the base portion **26** via a hinge **28** (shown in phantom) wherein it may pivotally be opened to a position **29** (shown in phantom) and may be secured in the depicted closed position at the opposite corner via a fastener **30** (shown in phantom), e.g., a snap-fit type fastener or the like. For example, fastener **30** may be comprise a protrusion formed on one of the

members **24** and **26** engaging a complimentary depression or receptacle formed on the other.

Referring now to FIGURE 3, there appears a plan view of a carton sidewall blank **12** with integral handle **20**. The sidewall blank **12** is formed of a sheet material such as a paperboard material, plastic, or a combination thereof, and preferably a paperboard and plastic laminate. The sidewall blank **12** can be cut, e.g., die cut, from a larger sheet of material, with the cutout regions **34** and, in some cases, the handle openings **36**, forming the only waste. Furthermore, in some cases, handle openings **38** may be cut on three sides and scored along edges **38** for hingedly or swingably folding about the line **38** to reinforce the handle **20** when grasped.

Horizontal scoring lines **42** may be formed parallel to transversely extending edges **44** for folding therealong, e.g., toward an unprinted surface **40** of the sidewall **12**. Alternatively, the upper edge may be reinforced by rolling, e.g., toward the printed side of the sidewall blank **12** opposite the unprinted side **40**.

During construction of the carton **10**, the optional handle portion **20** is folded along the line **32**, toward the unprinted side **40**. The folding of the handle **20** provides additional strength to prevent tearing. However, a non-folded, single-ply handle is also contemplated, e.g., wherein the sheet material forming the sidewall and handle is of sufficient strength to allow the unit to be carried without tearing.

The edges **44** may be folded or rolled as described above. The sidewall blank **12** is then bent or shaped about a mandrel, which may be facilitated by vertical scoring lines **46** preformed in the regions of the blank **12** corresponding to the rounded corners **48** (see FIGURE 1) of the container **10**. As stated above, the carton **10** in accordance with the present invention is particularly adapted to carry a plurality of like or like-sized objects wherein at least a portion of each object has a generally circular cross-sectional shape, such as a generally cylindrical objects, generally round or spherical objects, and so forth. Thus, the mandrel about which the vertical sidewall **12** is formed produces

curved, non-folded corner regions **48** which preferably have a radius of curvature approximately equal to that of the objects **16** to be carried.

The blank **12** is sized so that the axially extending ends **49** (i.e., extending parallel to the axis of the formed tubular sidewall **12**) form an axially extending overlap or seam **51** (see FIGURE 1), e.g., of about 0.6 cm (0.25 in) to about 1.25 cm (0.5 in), and more preferably about 1.0 cm (0.375 in). The ends are joined via bonding, e.g., via an adhesive such as a hot-melt adhesive, thermosealing varnish, heat-sealable aqueous overcoat, or the like. Preferably, sidewall **12** is formed of plastic or a paperboard or other sheet material comprising a plastic layer or film, such a thermoplastic layer or film so as to render the material sealable via a conventional thermosealing process, wherein facing layers of plastic are joined by surface fusion upon the application of heat and pressure. The plastic film may be applied to the regions of overlapping surfaces to be joined, or, more preferably, over the entire surface of the sheet material forming the container **10**. The plastic film may be, for example, acrylonitrilebutadiene-styrene (ABS), polyolefin such as high, medium, or low density polyethylene, polypropylene, methacrylene-butadiene-styrene (MBS), polystyrene, polyvinyl chloride, polyester, or like materials. The construction of the carton **10** of the may be performed manually or under automated or preprogrammed control.

In the depicted embodiments of FIGURES 1-3, the seam **51** is illustrated in a position along one of the generally planar sides **53** a side, i.e., disposed between two of the corners **48**. However, it will be recognized that the seam **51** and optional handle **20** may also be placed at or near one of the corner regions **48**, as depicted in FIGURE 4.

Referring now to FIGURE 4, a carton **110**, which may be substantially as described above by way of reference to FIGURE 1, includes a handle portion **120** which extends from an edge of a sidewall blank **112** forming a seam **51** at a corner **48** of the carton **110**. Although the handle **120** will have an increased tendency to lie flat against the sidewall **112** when located between corners, the handle can be retained against the side wall, especially when placed

on the corner, via spot gluing, e.g., by the application of adhesive tabs to secure the handle against the sidewall **112**, which are releasable upon the grasping of the handle by the purchaser. The handle **120** may be folded as shown in FIGURE 3, or may be a single ply handle as depicted in FIGURE 5.

5 With reference now to FIGURE 5, an exemplary sidewall blank **112** of FIGURE 4 is substantially as described above by way of reference to FIGURE 3, but includes a single ply handle **120** and vertical score lines **46** arranged so as to facilitate bending such that the seam **51** lies on a corner **48** (see FIGURE 4).

10 With continued reference to FIGURE 4, a lid **22** includes a rim **26** swingably attached to a lid panel **24** via hinge **28**, e.g., of a type having rotating or flexible members. The lid panel **24** and rim **26** components of the lid **22** may be formed of the same or a different material, and may be plastic, paper, or a combination thereof. The rim **26** and closure panel **24** are preferably adapted so as to provide a positive retention of the panel **24** when the panel **24** is rotated  
15 into a closed position.

FIGURE 6 illustrates an exemplary carton **210** according to yet another embodiment of the present invention which lacks a carrying handle. A preferred embodiment lid **222** includes a rim **226** and a swingably attached panel **24** via hinge members **28**. The rim member **226** includes a peripheral wall **228**  
20 received within and conforming to the opening **29** in the tubular carton **210**, and a peripheral flange member **230** engaging upper rim **18** thereof.

With reference to FIGURE 7, a exemplary bottom blank **14** is cut or stamped oversized with respect to the opening **23** of the carton **10** (see FIGURE 1). In construction of the bottom member **14** of the carton, the peripheral region  
25 **50** is folded about the line **52** such that the region **50** forms a downwardly extending peripheral wall **50** (see FIGURE 2). The blank **14** may be scored for folding along the line **52**, which conforms in size to the size of the opening **23**.

Referring now to FIGURE 8A, there appears a cross-sectional view of a preferred joint formed between the sidewall **12** and the base **14**, taken along the lines 8--8 of FIGURE 1. The base portion **14** includes a downwardly  
30 extending peripheral portion **50** which is received in the space or channel **52**

defined by the sidewall **12** and folded edge **44**. The portion **50** may be secured within the channel **52** of the sidewall **12** via bonding, e.g., with an adhesive. Preferably, the sheet material forming the sidewall **12** and base **14** comprises a plastic, such as paperboard with plastic coating or laminate, in which case the base and sidewall may be bonded by thermosealing as described above.

FIGURE 8B illustrates an alternative joint between the sidewall **12** and a non-folded base member **14a**, which is sized to conform to the size of the opening **23** (see FIGURE 1) and is joined at its peripheral edge by an overlapping folded edge **44** of the sidewall **12**. The overlapping edge **44** and the peripheral edge of the base **14** may be secured via adhesive bonding or, in the case of plastic or plastic laminated sheet material, via thermosealing as described above.

Referring now to FIGURE 9, there appears an alternative generally triangular carton **60** including a vertically raised peripheral sidewall **62** secured to a base **14** as described above. The carton **60** is adapted to hold bottles **16** of a type having a narrow neck portion **64** adjoined to a wider base portion **66**, e.g., via an intermediate shoulder portion **65**. The sidewall **62** extends at least as high as the top of the base portions **66** of the bottles **16**. The carton **60** preferably includes a structurally reinforced upper rim **68** formed, e.g., by folding or rolling the upper edge of the sidewall panel **62**. The carton **60** is depicted with an optional handle **20** integrally formed with the sidewall panel **62**.

A lid or cover **72** includes a plurality of apertures **74** arranged and adapted to receive the bottlenecks **64** when the lid **72** is placed on the sidewall **62** such that at least a portion of the bottleneck **64** protrudes therethrough, and preferably resting on the shoulders **65**. A plurality of slits **76** are spaced about and extend radially from the apertures **74**. The paperboard or other sheet material forming the lid **72** is sufficiently rigid or stiff so as to stabilize the bottles **16** within the container **60** and provide positive retention of the bottles **16** therein during transport, handling, and when the container **60** is carried by the handle **20**.

Although the material forming the lid **72** has sufficient stiffness to retain the bottles, the material forming the lid **72** is also sufficiently flexible or

Although the material forming the lid **72** has sufficient stiffness to retain the bottles, the material forming the lid **72** is also sufficiently flexible or deformable such that the radial tabs **77** defined by the slits **76** and openings **74** will give way so to allow a bottle **16** to be removed from the carton when desired by grasping the protruding portion of the bottleneck **66** and pulling the bottle **16** upward and through the opening **74**, without it being necessary to remove or detach the lid **72** from the carton **60**. The slits **76** may be precut or, alternatively, may comprise perforated lines, partially cut lines, or otherwise weakened regions, which allows the slits **76** to be readily broken when a bottle **16** is removed from the container **60**.

The lid **72** may be fastened to the upper rim **68** of the sidewall **62** via any number of methods. For example, a mechanical or adhesive type of fastener may be employed or, in the case a carton formed of a plastic or plastic laminate sheet material, the lid **72** may be bonded or fused to the sidewall **62** through the application of heat and pressure as described above. In the embodiment depicted, the peripheral edge **78** of the lid **72** is folded (both upwardly and downwardly folded edges are contemplated) to provide a vertically aligned surface for bonding or fastening to the rim **68** of the sidewall **62** (fastening to an interior or exterior facing surface of the sidewall **62** is contemplated). Alternatively the lid **72** may be fastened to the sidewall **62** through the use of clips, a snap-fit or interlocking engagement between the upper rim **68** of the sidewall **62** and the peripheral edge **78** of the lid **72**, or other mechanical faster.

FIGURES 10 and 11 depict alternative lid members **172** and **272**, respectively, for use in connection with the embodiment of FIGURE 9. The lid **172** includes apertures **74** formed on a panel **124** bounded by a rim **178**. The apertures **74** are sized and arranged to receive necks of beverage bottles or the like to be carried in the carton. Each aperture **74** includes a plurality of slits **76** (four in the depicted embodiment) radially extending from and spaced about the apertures and defining flexible, deformable, or deflectable tabs **77** therebetween. In the preferred arrangement shown, the arrangement of the radially slits **76** for

each aperture **74** are rotationally offset with respect to the slits **76** of adjacent apertures **74** so as to avoid interference therebetween.

FIGURE 11 shows an alternative lid **272** including apertures **74** for receiving bottlenecks of beverage bottles or the like to be carried in the carton formed on a lid panel **224**. A series of perforated, partially cut, or otherwise weakened lines **276** defines a plurality of breakaway panels **277**, with each breakaway panel including one of the apertures **74**. The perforations or otherwise weakened lines **276** bounding each breakaway panel **277** allows each breakaway panel to be selectively removed from the lid panel **224** upon an upward pulling force by a user. Thus, a bottle to be removed from the carton without removing the lid **272** from the carton.

With reference to FIGURE 12, an alternative carton embodiment **160** having protruding necks and which may be constructed as described above by way of reference to FIGURE 9, but which includes a handle **120** extending from a seam **51** formed along a corner **48** of sidewall **162**. A lid **178** is received on the sidewall **162** and includes a plurality of apertures **174** adapted to receive necks **64** of bottles **16** therethrough. The lid **178** may be removable from the carton **160** and/or may optionally include radial slits or breakaway panels as described above by way of reference to FIGURES 9-11.

Referring now to FIGURE 13, a carton **80** adapted to hold three golf balls **90** or other balls such as tennis balls, baseballs, softballs, and the like, or other spherical objects, includes a sidewall **82**, a base **84**, and a lid **92** and may be constructed as described above. A first packaging array, namely, an 18-pack of the golf balls **90**, comprising six cartons **80** in hexagonal arrangement is shown in FIGURE 14. Alternatively, as shown in FIGURE 15, any integral number of three-unit packages **80**, preferably from 2 to 12, may be packaged in an outer triangular carton **180** having a length adapted to receive a desired number of the packages **80**.

With reference to FIGURE 16, there is shown a further embodiment carton **310** in accordance with the present invention which is adapted to carry elongate, e.g., generally cylindrical, objects **116**. Although depicted with three

objects, it will be recognized that the carton may be adapted to carry other numbers of objects, such as six, ten, fifteen, etc. Examples of elongate articles to be carried include, for example, cigars, cigarettes, rolls of sheet material such as aluminum foil, plastic sheet material, paper, and so forth. The carton construction **310** includes a sidewall **312**, a base panel **314**, and a lid **322**, and may generally be constructed as described above. A handle, not shown, may optionally be provided.

The invention has been described with reference to the preferred embodiments. Obviously, modifications and alterations will occur to others upon a reading and understanding of this specification. The forms hereinbefore described being merely explanatory and exemplary, it is intended that the invention be construed as including all such modifications and alterations.